EMERGENCY VEHICLE REPLACEMENT PLANNING

EXECUTIVE DEVELOPMENT

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ABSTRACT

The purpose of this research project was to identify the components necessary to implement a command vehicle replacement plan. It was based on a problem at Clark County Fire District 3 in Brush Prairie, Washington. The project employed historical, descriptive, and evaluative research methodologies to, (a) identify criteria fire departments use for command vehicle replacement, (b) identify whether or not the plans or policies are in writing and strictly followed, (c) identify when is the best time to replace a sport utility command vehicle, and (d) identify the necessary components for the development of a command vehicle replacement plan.

Procedures included research, analysis and interviews. Several sources were reviewed; the policy of other agencies, planning references, fire service management references, fleet management journals, fire district records, market guides and the Internet. A cost analysis was completed utilizing research that required access to Fire District 3 records. Interviews were completed with fleet managers responsible for repair, maintenance, and replacement of fire service apparatus and vehicles.

The results were based on the criteria that effected the fleet management decision; condition, age and mileage, available funding, use review, user input, depreciation, and life costs.

The recommendations included immediate replacement suggestions along with the steps necessary to put the plan into use; (a) The Chief and Board of Commissioners review the project, (b) the Chief and Board approval of the Administrative Guide, (c) the Program Manager completes a review of the entire fleet using the listed criteria, (d) the Program Manager recommends replacement needs to the Chief based on the review, (d) the Program Manager develops a priority list for long term replacement needs, and (e) with Chief recommendation, present the plan to the Board of Commissioners for budget appropriation.

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INTRODUCTION

Fire District 3 (FD3) has maintained the condition of its emergency vehicle fleet using the highest of industry standards. However, it has not established a specific plan for the replacement the fleet. Replacement has occurred when poor vehicle condition leaves no viable other option. Currently, the district owns three Command Sport Utility Vehicles (SUV) that average over 9 years in age and 91,000 miles. While this may not be out of the ordinary for a small department in times of tax limitations, a plan may enable the district to replace them, resulting in better fleet condition, reliability and value.

The purpose of this research project is to complete and justify a plan for replacement of the existing command SUVs at FD3. It will also fulfill a requirement for the Executive Development course, of the Executive Fire Officer Program (EFOP) at the National Fire Academy (NFA), in Emmittsburg, Maryland. The project was selected based on a problem identified in the Apparatus Program at FD3. FD3 does not have a plan for the replacement of command vehicles. The purpose of this research project is to develop and justify a command vehicle replacement plan that FD3 can put into use at once.

This project employs historical, descriptive and evaluative research methodologies. Historical research will be used look at the past practices of the FD3 and replacement practices of other fire agencies to find what has been effective. Descriptive research will be used to determine the current fleet management practices of different sized departments in the way of interviews. Evaluative research will be used to analyze the overall costs of the three current command vehicles now in use, and to recommend a policy to implement at FD3.

After the problem and purpose statements were finalized, research questions were developed to focus efforts. The following questions will be answered:

1. What criteria do fire departments use for command vehicle replacement?
2. Are the plans or policies in writing and strictly followed?
3. When is the best time to replace a command SUV?
4. What are the necessary components for the development of a command vehicle replacement plan?

BACKGROUND AND SIGNIFICANCE

FD3 is located 30 miles North and East of Portland, Oregon. The population is approximately 18,000 and the size is 80 square miles. The area is a rural residential community comprised of small acreage's on the East side of rapidly growing Clark County, Washington. The District was formed in 1947 by a community effort and operated with limited financial resources. One of the first recorded budgets of the fire district was just over $3,600 (Fire District 3 [FD3], 1959). Many of the apparatus were purchased used or retired from other uses and converted for fire service use.

FD3 now has a budget just over $1.6 million. The Insurance Services Organization - Fire Protection Class Rating for FD3 is a Class 5. The district provides Public Education and Prevention, Fire Suppression, Emergency Medical Services, Hazardous Materials Response, and various other emergency response and support services. FD3 will respond to approximately 1000 calls this year out of 4 stations, with 15 apparatus, and 50 personnel, 12 career and 38 volunteer. The organizational structure includes one chief officer, two deputy chiefs, three career shift captains and six career shift firefighters. Thirty-eight volunteers include from home, resident, and interns that serve in various roles within the organization.

In recent years, the District's role has grown in terms of scope and responsibility. It now has more assets, a larger budget, and increased expectations from the public. This growth has expanded district programs and resources. It has also brought an increased demand for services. While the District has been working to keep up, financially it has not been able to budget enough money out of annual tax collections for the various needs. The annual budget has been spread thin to be used for both operational and capital needs. FD3 management, as required in the values of the 1998 Strategic Plan, has managed programs progressively in order to maintain the emergency vehicle fleet and protect the public investments (FD 3, 1998).

The District Program Management System defines the purpose, policies, goals, and responsibilities of each program. The Fire District 3 Apparatus Program Statement describes one of the main program goals is to provide the community with fire apparatus that is functional and in top working condition (FD 3, 1993). In 1992, the voters passed a $3.3 million bond issue that was used to replace apparatus, build and remodel facilities, and purchase emergency equipment. The District purchased two new fire engines, two new brush engines and two command vehicles, one new and one used. The District also built two new stations, remodeled two stations, and purchased land for a future station. The District replaced another fire engine in 1998, financing it for a period of 7 years. These purchases enabled the District to replace several outdated apparatus and improve the overall condition of the fleet.

With increased service demands, all apparatus are being used more and requiring replacement sooner than expected. The command vehicles are the most frequently used, primarily for administrative and response purposes, and are now experiencing various mechanical problems. The cost analysis indicates that repair costs began to significantly increase between vehicle age 4 and 5, and at 50,000 to 60,000 miles (see Appendix A, Table 1 and Table

2). During the last 18 months, they have totaled the single highest repair expense for any of the equipment types, averaging nearly $2000 each. The vehicles are all 4-wheel drive, model years 1989, 1991, and 1993. They are driven on the average of 10,000 miles per year.

> The age of the fleet has many implications for fleet performance and the cost of fleet maintenance. As a fleet ages, repair events increase and become less predictable, and the repairs are no longer minor in nature. The consequence is a less reliable fleet, a higher out of service rate, longer turnaround times, and more costly repairs (Griffith, 1997, pg. 13).

This project will recommend a replacement plan for these command vehicles. The plan, with the approval of the Fire Chief and the Board of Commissioners, will be used at once. The project links directly with the Executive Development Manual, Chapter 10, Service/Quality, Dimensions of Quality. The Service Quality chapter provides a "Dimensions of Quality" Glossary that provides concepts that tie directly with the concerns described in this research.

> Aesthetics - Appearance, fits, finishes; Conformance - The match with specifications or pre-established standards; Durability - Product or service life; Features - The secondary characteristics of the product or service; Perceived Quality - Reputation; Performance - The primary operating characteristics of a product or service; Reliability - The frequency with which a product or service fails; Serviceability - The speed, courtesy, and competence of repair (National Fire Academy [NFA], 1998, SM 10-25).

Emphasis is put on planning and policy design, but a recommended replacement plan will be provided for the three vehicles discussed. The results of the research could become a catalyst to create other replacement plans for FD3.

LITERATURE REVIEW

Several sources were studied to prepare this project. Books, journals, interviews and the Internet were reviewed. The search of related materials was completed at the Fort Vancouver Regional Library, Vancouver, Washington, Clark College Library, Vancouver, Washington, Fire District 3's library, and the Learning Resource Center (LRC) at the NFA.

Interviews were conducted with the shop managers of the Portland, Oregon and Vancouver, Washington Fire Departments. Interviews were also conducted with personnel responsible for fleet management at the Vancouver Fire Department, Clark County Fire District 6, Clark County Fire District 11 and the United States Forest Service – Mount St. Helens Monument.

This research provided opportunity to study and evaluate several sources pertaining in some way to replacement planning for the SUV type command vehicle. Research was conducted using information concerning fire service management and planning, fleet management and FD3 management goals and objectives.

Fire Service Management

Fire service agencies should develop a focused plan for its apparatus or fleet management. The manager responsible for apparatus and maintenance must insure that apparatus are kept at a high level of operating efficiency. Apparatus inspection and maintenance records should be compiled and monitored. These records will enable the agency to track the status of major apparatus and effectively plan for replacement (National Fire Protection Association [NFPA], 1997, pg. 10-16). "It also enables the manager to monitor apparatus use to determine what optimal replacement would be, given changes in the composition of the community and corresponding shifts of use of equipment" (Grant, 1994, pg. 256). Replacement

cycles depend on the characteristics of the jurisdiction. Frequency of use, equipment design, finances and maintenance are factors in the cycle. As described in the National Fire Protection Association (NFPA) Handbook, "The normal life expectancy of first line fire apparatus will vary from city to city, depending on the amount of use the equipment receives and the adequacy of the maintenance program" (NFPA, 1997, pg. 10-16). The plan should be specific, directed at clearly defined goals, and set over a period of 1 to 5 years. Part of the plan should be for future replacements, including apparatus:

> All fire service organizations should develop a needs assessment and amortization or replacement schedule for their major equipment in anticipation of growth or cutbacks, service life, obsolescence, maintenance costs, and so on. A rational replacement schedule is essential to sound resource management. (International City Management Association, 1988, pg. 178).

The plan should include budget appropriations that are factored into the process and designed to maintain the condition of the current fleet.

> It is the responsibility of the organization to guarantee maintenance and financial management responsibilities; the purchase and replacement costs of apparatus should be a regular line item in the budget….Fire apparatus normally run from 1 to 2 percent of payroll costs (NFPA, 1997, pg. 10-208).

Regular budget appropriation will provide the fire department with a reliable fleet at all times and it is key to use the funds for what they are designated for. "Do not borrow long to pay short. An example of this would be using capital recovery or depreciation funds accumulated for equipment replacement to fund operating deficits. Prolonged use of this technique will lead to disastrous results" (Sitnek, 1996 pg. 51-54). However, limitations are a reality. Community

expectations, size, and history all factor into replacement plans. The key will be to work within the means available.

> Even with their hands tied, fleet managers must be good stewards of public funds. That begins with open communication with city or county elected officials. Frustrations aside, fleet managers all say good trade cycle strategy must be based on political reality (Moore, 1997, pg. 4).

Planning and communications are key to success. Statistical data and ongoing review will enable the fleet manager to recommend changes or replacements in order to keep the fleet in top condition. “The end results will be positive; improvements in design, maintenance costs become more favorable, operating efficiency increases, and equipment remains reliable” (NFPA, 1997, pg. 10-208). These recommendations can then be communicated to the legislative body and used to update plans and appropriate funding.

Fleet Management

Fire service fleet managers base decisions primarily on performance, safety and reliability. In contrast, decisions by industry managers are often based on the end profit margin.

> In the world of industry, equipment replacement decisions are difficult because so many complex questions are involved. Such decisions are usually made by considering long and short-term profitability. The basis for the purchase of a new piece of equipment usually is whether or not it will pay for itself in a specified period of time (Carter\Rausch, 1993, pg. 276).

Similarly though, all fleet managers must stick to a strategy. "While there are plenty of wrong ways to operate a company fleet, there is no one right way" (Wakin, 1994, pg. 55). A defined plan or strategy must be followed.

> Regardless of where fleet managers fall on the replacement continuum, the one belief they share is the need to stick to a strategy. Regardless of the differences, a sound philosophy must rule, even if it has a little give in it. (Moore, 1997, pg. 2).

Interviews were held and information was gathered from several fire service fleet managers, managing fleets with budgets ranging from $1 to $67 million (see Appendix C). These experts make decisions based on policy, experience, philosophy, financial limitations, demographic considerations and political factors. Most are working with established but often "unwritten" rules. Predetermined mileage and age, condition, depreciation, safety features, new technology, perception, condition, user input, vehicle use, repair cost, gut feel, and political issues effect their decisions. A summary of the interviews follows.

A target age and mileage range is used to determine replacement. Driver and mechanic input, condition, and repair history also factor into the decision. Established miles and age is used as a guideline to prioritize replacement order of like vehicles. Of the departments interviewed, the replacement age averaged 5.4 years and the mileage averaged 71,000. Some of the departments used warranty life as a key factor in replacement criteria, however warranties generally lasted just 3 years or 36,000 miles. The Vancouver Fire Department maximizes warranty life when possible (S. Streissguth, December 12, 1999, personal communication). The size of the department did not clearly make a difference. The smallest department Clark County Fire District 11, with a $1.5 million budget, targeted 6 years and 100,000 miles. The largest department, the Portland Fire Bureau with a $67 million budget, targeted 6 years and 75,000 miles. Vehicle rotation is used by many in order to reduce the mileage when possible.

Some of the departments do not consider depreciation at all, but others do. Clark County Fire District 6 uses vehicle value as primary criteria; "Market value is key" (B. Lothspeich,

December 17, 1999, personal communication). All view statistical data as a tool, but use it differently. Departments that have analyzed and totaled life costs of vehicles tend to use depreciation as a criteria in the replacement plan. Others simply factor life costs into the budget and follow the mileage and age guidelines to make decisions. All recognize the validity and possible benefits of depreciation and resale value in fleet management.

Technology and safety features are not usually major factors in replacement decisions. A critical factor is whether or not the vehicle is doing its job, and safety is always a concern. When new purchases are made, technology and safety features are considered. Clark County Fire District 11 (FD11) considers new technology when it's time to buy (A. Kostman, December 17, 1999, personal communication).

Most fire service agencies are concerned with public perception. On one hand, public confidence is critical. On the other hand, the image of sound fiscal management is a concern and is critical at the voter's booth. Most try to maintain a perception of quality without appearing flashy. Vehicle options are specified with public perception and emergency responder needs in mind. The Portland Fire Bureau, like most, strives for a balance "We want public confidence, a professional look, and a vehicle that meets the technological needs of the user" (B.Powell, December 22, 1999, personal communication).

Emergency vehicles must be reliable. Condition is a concern for all fleet managers. Performance, safety, replacement, public perception and resale value all depend on vehicle condition. In all cases, the replacement schedule can be extended or shortened depending on condition. "Condition factors heavily" (A. Kostman, December 17, 1999, personal communication).

Users are involved in the replacement decision. The mechanic and driver can help extend or shorten the life. "Who knows it better than the person that drives it and works on it" (Kostman, 1999, personal communication). "The shop tells us where it goes" (S. Streissguth, December 23, 1999, personal communication).

Vehicle use is key. Is it used for what it was originally intended? The job requires the right tools (M.Tanninen, December 17, 1999, personal communication). The United States Forest Service rents vehicles and must justify monthly expenditures. This requires constant review of use. If the vehicle is no longer needed, it is disposed of or replaced with the proper vehicle (B.Babb, December 28, 1999, personal communication).

Maintenance costs are monitored over the life of the vehicle. Continual repairs are tracked, indicating a possible pattern. Rebuilding major components in an aged vehicle usually does not pay off; other smaller repairs almost always follow. Vancouver Fire Department Shop monitors ongoing costs. "Rebuilding does not extend the life, it will nickel and dime you" (M.Tanninen, December 17, 1999, personal communication). Cost per mile is analyzed at times in order to compare to other vehicles. Some simply budget a certain amount per year without regard to the total lifetime repair costs of the vehicle.

Objective facts are the keys in good decision-making. Gut feel does have its place, but an intimate knowledge of the vehicle is required. "You have got to have facts. Bias or impression does not cut it" (M.Tanninen, December 17, 1999, personal communication). The bottom line is if the vehicle is costing money, it will usually be replaced early. With good guidelines in place, gut feel is not solely depended on; it's not necessary.

Political issues vary. If guidelines and plans are established, there are fewer problems. Good data tracking will provide the opportunity for all to be objective and ease the decision

process. "The Board supports the recommendations, but usually something else must be given up" (A. Kostman, December 17, 1999, personal communication). Other local problems can become an issue. "The City Council sees a pot of gold that is intended for replacement, and takes it" (B. Powell, December 22, 1999, personal communication). Tax limitation issues effect change by reducing available funding and altering established plans "We have had no problem until Initiative 695, now we're not sure" (B. Lothspeich, December 17, 1999, personal communication).

The interviews impacted the project significantly. Most notably, they provided information that was consistent with published sources. They outlined a comprehensive formula for success. Knowing what to look for, what to track, and how and when to make a change are all-important parts of the formula. When the criteria is used properly, it will answer the fleet replacement questions.

Fire District 3 Management

Fire District 3 depends on the quality of tools, people, and service for success. Of the tools, vehicles are the most prolific resource.

> Fire District 3 provides emergency service from four fire stations, strategically located throughout the fire district. Each of the stations is equipped with fire and emergency medical apparatus and equipment. Changing technology, standards, and expectations force continued equipment additions and improvements. The costs of acquisition and maintenance continue to rise. A 1968 automobile was great in 1968, but probably wouldn't provide the safety, performance and security your family requires today. The same thing applies to your fire department; we must continually change and improve with the safety and security needs of the community (FD3, 1999, pg.3).

It is the goal of FD3 to provide the best vehicles within its available resources. The Apparatus Programs Manager is required to insure apparatus are mechanically ready, and have knowledge of new apparatus features and functions, recommending changes and purchases. "It is the goal of FD3 to provide the community with fire apparatus that are functional and in top working condition" (FD3, 1993, section 3). The Value Statement of FD3 includes statements that accurately describe its intent. "We minimize risk to our personnel and the public in all of our actions and decisions. We protect the public investment by conservative fiscal management" (FD3, 1998, pg. v).

In the 1998 Strategic Plan update, the District identified the need to continue planning for the future. A task listed under the apparatus section is to "Generate an Apparatus Master Plan". Listed in the plan are goals; one of which is to "Complete a Replacement Schedule" (FD3, 1998). The District is obviously concerned about the condition of its fleet and the finances that are required to maintain it.

These sources and interviews provided several key pieces of information that impacted this research project and provided answers to the questions; fleet management should include planning and vision, budgeting, policy and guidelines, standard criteria and procedures, and ongoing evaluation.

PROCEDURES

This topic was chosen while attending the Executive Development Course. The problem statement was written based on the need of a specific apparatus replacement plan at FD3 while considering the requirements of the EFOP. The purpose was to ultimately affect improvement in Apparatus Program Management at FD3. General research questions were developed intending on answering or fulfilling the purpose.

Research began in the first month and was conducted by reviewing information located at the NFA, practices of other agencies, general planning references, fire service management references, fleet management journals, fire district plans, strategies, guidelines, statistics, market guides and the Internet. A cost analysis was completed utilizing research that required access to district records.

The interviews were completed with individuals that have responsibilities in the areas of fleet management, repair, maintenance, and replacement. The individuals were chosen based on reputation, knowledge and experience. Budget size and population of their jurisdictions were considered in order to get a sampling of answers from both large and small departments. The interviews lasted 20-30 minutes and were conducted utilizing questions generated while reviewing fleet management references. The questions were placed on a form to insure question accuracy and standardization between each interview (see Appendix C).

Creation of the document began using American Psychological Association format. When information was insufficient, the problem and purpose were reviewed, additional research was conducted, and the process repeated. References were checked for content and accuracy, and format was reviewed based on the requirements.

Limitations in the research were experienced. Current sources concerning the specifics of this topic were limited. Applied Research Projects on file at the LRC at the NFA included several replacement plan research papers, but were not concerned with the specifics of this problem. The reference material, in the way of books and journals helped define the interview questions. The Internet and published journals provided recent findings and helped shape results considerably.

The results were identified after reviewing the facts and validating the consistency of each, regardless of where it was generated. Facts were then compared to the interview results and the data analysis of existing vehicles.

RESULTS

A cost analysis was completed on the three command vehicles mentioned (See Appendix A). The analysis included the purchase price, repair costs (without routine maintenance), and depreciation values (Table 1). All cost and repair values were derived from documented fire district purchase and repair records. Depreciation was estimated using Kelley Market Values and based on wholesale estimates (Kelley, 1990, 1991, 1992, 1993, 1994, 1995, 1996a, 1996b, 1997a, 1997b, 1998a, 1998b, 1999a, 1999b). The three value sets were then averaged for a final summary (Table 2). The analysis shows that when factoring depreciation and repair costs, the out of pocket expense begins to sharply increase at 5 years. The value of the vehicle steadily declines and repairs increase, requiring additional funds to replace it as it ages. At approximately 5 years and 60, 000 miles, the amount of additional funds to replace equals the value of the vehicle, indicated in gray (Table 2). Past this age, the cost to replace steadily increases while value is lost. This is due to the compounded depreciation loss of the original

vehicle, compounded repair costs of the original vehicle and the new vehicle price increases estimated at 3% each year.

The Administrative Guide was developed as a product of this research using the listed results. The guide includes definitions, planning, budgeting, replacement criteria, and responsibilities (See Appendix B). Certain elements of the guide will require district sessions that define priorities, review data, discuss planning and approve proposals.

Answers to Research Questions

Research Question 1. What criteria do fire departments use for command vehicle replacement? The most definitive answer to this research question is that decisions are based on a combination of different criteria. Many variables play into the fleet management game. The following items make up the criteria for the command vehicle replacement plan:

- Condition.
- Age and mileage.
- Available funding.
- Use review.
- User input.
- Depreciation.
- Life or whole life cost.

Condition is the single most important criteria in replacement decisions. "The vehicle must look nice in the public eye. It should be clean and orderly. If you let it go, it's gone", (M.Tanninen, December 12, 1997, personal communication). "Maintenance of fire department apparatus and equipment at peak operating efficiency is a primary fire department responsibility"

(NFPA, 1997, chap. 10). The needs of emergency services requires that vehicles be in the best condition possible with little possibility of failure.

Departments do allow for adjustments in age and mileage criteria. The adjustments may shorten or lengthen the vehicle life. "Condition is the primary factor" (S. Streissguth, December 23, 1999, personal communication). "Condition effects safety and resale value" (B. Lothspeich, December 17, 1999, personal communication).

Age and Mileage is a universal benchmark in vehicle replacement. Industry, public service and the public sector place a clear value in the number of miles and age of a vehicle. Age and mileage directly factor into depreciation estimates**.**

> Mileage is indeed one of the major factors in how costs develop - but the used car market is still intrinsically driven by age, and there is always going to be an enormous difference in residual values between a one-year-old, 60,000 mile car and a four-year-old, 60,000 mile car. Obviously, this polarizing effect will be reduced for very high mileage, with smaller differences in the annual mileage rate, but time is still an important ingredient in the overall costing equation (Whyte, 1997).

Available funding is a factor in replacement cycles. As discussed by Moore (1997), managers must work with resources available. The budget will determine the overall policy, philosophy, and direction of plans and strategies. Planning will provide a process and means to communicate and justify replacement expenditures, and therefore make room in the budget. In the end, these large expenditures will require previous planning and sound money management.

User input is critical and weighs heavily in the decision making process. Drivers and mechanics can provide considerable input on overall condition, which is a key factor in

replacement. They also can provide information that can extend or shorten the life of the vehicle and whether or not the vehicle is doing what it is designed to do.

Use review must occur to evaluate the performance of the vehicle. Improper use can become safety and maintenance problems. If the vehicle is not doing the job, and is in good condition and within reasonable age and mileage ranges, selling and shifting the value to the vehicle that can replace it may be appropriate.

Depreciation is the single most expense in terms of long term vehicle worth. The three FD3 command SUVs have experienced significant depreciation (see Appendix A, Table 2).

> The largest single expense in running one fleet car - and therefore the whole fleet - is depreciation. This is the real money difference between what is paid for the car when new, and what it fetches on disposal. The full and true costs of depreciation can only be identified once the vehicle has been sold (Whyte, 1997).

Life cost of the vehicle is an essential statistic to monitor. The vehicle repair, maintenance, fuel use, and depreciation must be evaluated routinely. "These three - depreciation, maintenance and fuel costs - are the ones most normally used to build up the whole life cost picture" (Wythe, 1997). Close monitoring of the costs will give the manager information concerning the overall condition, reliability and financial data that could be used to determine replacement timing.

Research Question 2. Are the plans or policies in writing and strictly followed? Often, policies are not written and in place. Most agencies do plan replacements at a certain time or interval. Some are disciplined and committed to planning while others replace when the vehicle is obviously inadequate or unsafe, reacting to the poor condition. A critical result identified was that key to replacement planning is communication rather than a strict written policy. The

communication will keep all involved aware of the fleet condition and the steps necessary to maintain and improve it.

Research Question 3. When is the best time to replace a command SUV? Replacement should occur at a time that can maximize value (avoiding depreciation) and condition (prior to major or continual repairs). The best age and mileage value varies between make and model. A command vehicle that is in good condition, maintained regularly, of generally good design and quality, should be replaced every 5 to 6 years and 50,000 to 60,000 miles. This range allows for variables in specific vehicles and an opportunity schedule replacement when multiple vehicles are due. These replacement recommendations are based on public safety response needs unique to the fire service.

Research Question 3. What are the necessary components for the development of a command vehicle replacement plan?

- A Policy.
- Focused Attention.
- Statistical Data.
- A Budget.
- Communication.

First and foremost should be a policy or guideline to steer the process. All personnel must know what is expected, but in particular, the administration should chart a course specific to the organization so that the plan can become successful.

Priority must be given, and the time taken, to assure that the fleet is in top condition. An officer should be assigned the responsibility of tracking and monitoring the fleet and compiling reports and data. A complete review of the fleet condition must be accomplished and priorities

set. The fleet manager must be aware of market prices and replace the vehicle at the optimal time considering depreciation, condition and operational needs.

Statistical data must be used to recognize developing patterns. Data can be tracked using computers that will have varying degrees of success. With community needs in mind, the data will help identify primary factors in determining replacement guidelines. These needs will allow the agency to set plans that will trigger the policy design and budgetary priorities.

"In general, the purchase and replacement costs of apparatus should be a regular item of the fire department capital budget" (NFPA, 1997, pg. 10-208). When the money is budgeted, administrators should do all that they can to ensure that the money is used for what it is intended.

All members must participate and be allowed to give input. Personnel must be motivated to meet expectations and take good care of the vehicle. This care will result in a fleet that is in good condition and able to bring higher resale prices.

DISCUSSION

The most critical aspect in replacing a command vehicle is the plan itself. It will provide the tools for determining replacement. Without the plan, it will be difficult to objectively look at the factors of age, mileage, condition, and depreciation. It will also be difficult for the legislative body to secure funding without receiving accurate requests and information concerning fleet needs. It is important to understand the history of the make, model, and specific vehicle while considering the factors. Special use vehicles may require formulas that factor other market values and specific considerations. The entire organization should be involved; the driver, mechanic, chief financial officer and legislative board should all know that eventual replacement is a necessity. All must understand the policy.

> There are two important aspects to any plan: (1) the plan itself, which must be feasible and directed toward clear goals; and (2) the process by which the plan is developed, which must ensure that all major goals are considered and every constituency to be affected by the plan is reasonably involved in the plan (NFPA, 1997, pg.10-29).

Command vehicle emergency response will push the vehicle to its maximum performance limits. The result is generally early failure of certain components requiring extensive repair. Many fire departments have excellent maintenance programs that are effective in keeping these vehicles in top shape.

> A preventative maintenance program should be set up for fire apparatus and equipment, with all minor repairs made promptly. Since fire apparatus is subject to frequent starts and relatively high-speed operation with cold engines, this approach becomes critical to maintaining dependable apparatus (NFPA, 1997 pg. 10-16).

However, certain failures can not be predicted. Focused attention must be given to age and mileage while considering emergency vehicle fleet replacement. "The longer you put off replacement, the more you will spend on maintenance. Everything suffers. It just spins out of control" (Moore, 1997).

> The maintenance of fire department apparatus and equipment at peak operating efficiency is a primary fire department responsibility. The safety of the public and fire department personnel, as well as fire-fighting efficiency, depend considerably upon the effectiveness of the maintenance program (NFPA, 1997, pg. 10-16).

Good fleet management requires the assignment of a manager or officer. This person should give focused attention the program, carefully monitoring the overall health and value of

the fleet. Purchase and replacement decision-making, record keeping, maintenance scheduling, quality control, and repair are primary areas of responsibility.

> Every fire department should assign an officer the responsibility for apparatus and equipment. This may be a part time job in small fire departments. The officer should be responsible for the condition, status, and department needs for both apparatus and equipment and should help prepare specifications in accordance with accepted standards for the procurement of new items (NFPA, 1997, pg. 10-16).

The statistical data collected, recorded and analyzed by the officer will be the final and single most important criteria required in the final decision for replacement. Ongoing review and evaluation of the total life cost of the vehicle must occur.

> Whole life costs are any costs, which are attributable to running a fleet car. Some people look at only one or two elements, others look at a much broader range. The largest single expense in running a one fleet car - and therefore the whole fleet - is depreciation. This is the real money difference between what is paid for the car when new, and what it fetches on disposal. The full and true costs of depreciation can only be identified once the vehicle has been sold. For whole life cost purposes, depreciation is usually taken as the difference between the price you pay for the car, and its predicted residual value at the point when it is expected to be sold (Whyte, 1999).

Many departments choose not to include depreciation into their replacement decision or do not have methods in place to do so. Protecting the fleet against long-term depreciation is a very important consideration for many fleet managers.

This study identifies, due to the emergency response element, that the best option to maintain the quality, dependability and value of a fleet is to have a progressive plan to replace

high use vehicles at regular intervals. The information found in this research will enable FD3 to implement a process that will provide the information needed for making replacement decisions.

RECOMMENDATIONS

The Fire District should now consider adoption of the Draft Apparatus Replacement Administrative Guide developed as a result of this research (see Appendix B). A reasonable approach would be to replace all of the three command vehicles in the next 3 years. Using the process described in the Administrative Guide, a replacement priority order will be established and one vehicle will be replaced in each of the next three 3 years. The cost of this recommendation will be approximately $45,000 over the 3-year period. This estimate includes depreciation and price increases and could be higher or lower based on vehicle condition and purchase and resale market prices.

With the AG adoption, FD3 will have a plan for the future replacement of command vehicles and the groundwork for other replacement plans that currently do not exist. The plan can be put into use with the following steps, the estimated timeline is 6 months:

- The Chief and Board of Commissioners review this Research Project.
- The Chief and Board approval of the Administrative Guide.
- The Program Manager will complete a review of the entire fleet using the listed criteria.
- Recommend replacement needs to the Chief based on the review.
- Develop a priority for long term replacement purchase needs.

- With Chief recommendation, present the plan to the Board of Commissioners for approval and budget appropriation.

The Administrative Guide and recommendations were developed based on results of this project. The criterion was derived from existing research that is proven and referenced; the guideline includes criteria for fleet review and the components necessary for a long lasting successful replacement plan.

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Appendix A

Life Cost Analysis

Appendix A

Cost Analysis

	1989 Bronco			1991 Explorer			1993 Bronco		
	Life Cost	**Blue Book**	**Mileage**	**Life Cost**	**Blue Book**	**Mileage**	**Life Cost**	**Blue Book**	**Mileage**
1990	16,739.00	16,739.00	0						
repairs	0.00								
1991	16,739.00	12,375.00	16,000	17500.00	17500.00	0			
repairs	0.00			0.00					
1992	16,739.00	11,800.00	28,000	17500.00	16300.00	19000			
repairs	915.67			0.00					
1993	17,654.67	10,975.00	40,000	17500.00	14600.00	35000	21000.00	21000.00	
repairs	672.72			100.00			150.00		
1994	18,327.39	10,125.00	48,000	17600.00	14125.00	43000	21150.00	17950.00	8700
repairs	275.00			0.00			0.00		
1995	18,602.39	8,925.00	56,000	17600.00	14700.00	55000	21150.00	17575.00	30,000
repairs	195.00			357.00			0.00		
1996	18,797.39	7,825.00	66,000	17957.00	12500.00	69000	21150.00	15500.00	44,000
Repairs	450.00			0.00			500.00		
1997	19,247.39	6,525.00	70,000	17957.00	10450.00	76000	21650.00	14000.00	55,000
Repairs	150.00			0.00			750.00		
1998	19,397.39	5,700.00	81,000	17957.00	9050.00	88000	22400.00	12150.00	66,000
Repairs	1,957.00			2003.00			2200.00		
1999	21,354.39	5,200.00	95,000	19960.00	6475.00	96000	24600.00	10326.00	75,000

Table 1

Appendix A

Cost Analysis

All values based on averages of the three examples.

Age	Depreciation %	Value	Depreciation $	Repair Costs	Deprec.+repairs	Kelly Blue Book Value - repair costs at	
0 years	0	20000.00	0.00		0.00	20000.00	
				388.00			
3 years	20%	16000.00	4000.00	388.00	4388.00	15612.00	
				759.00			
4 years	27%	14600.00	5400.00	1147.00	6547.00	13841.00	
				825.00			
5 years	36%	12800.00	7200.00	1972.00	9172.00	11975.00	
				798.00			
6 years	42%	11600.00	8400.00	2770.00	11170.00	10802.00	
				984.00			
7 years	51%	9800.00	10200.00	3754.00	13954.00	8816.00	

Sell the old vehicle, and purchase the same vehicle new 3 to 7 years later.

Replace at	Price Increase Per Year % -	Price of New Vehicle at -	Old Vehicle Value Minus Repairs -		Amount of Extra $ Required to Replace at -		Asset or Debt at Replacement Same Type Vehicle , – at -	
Year 0	0	20000.00	0.00		0.00		0.00	
Year 3	3%	21814.00	15612.00		6202.00		9410.00	
Year 4	3%	22509.00	13841.00		8668.00		5173.00	
Year 5	3%	23184.00	11975.00		11209.00		766.00	
Year 6	3%	23879.00	10802.00		13077.00		-2275.00	
Year 7	3%	24595.00	8816.00		15779.00		-6963.00	

Table 2

(Kelley, 1990, 1991, 1992, 1993, 1994, 1995, 1996a, 1996b, 1997a, 1997b, 1998a, 1998b, 1999a, 1999b)

Appendix B

Apparatus Replacement Administrative Guide

CLARK COUNTY FIRE DISTRICT 3
ADMINISTRATIVE GUIDE

SUBJECT: Apparatus Replacement Guide
NUMBER: AG113
PURPOSE: To ensure the Fire District 3 emergency vehicle fleet is in peak operating condition.
APPROVAL: **DRAFT**
REVISION:
PAGES: 1
ATTACHMENTS:
DEVELOPED BY: Sorenson

_____
Fire Chief

I. Definitions –
- Condition - The reliability of the engine, transmission, paint, interior, tires etc.
- Age, mileage - The Age and mileage of the vehicle at the time of the review.
- Budget - Equipment Replacement Line of the Reserve Fund.
- User input - Driver(s) and mechanic(s) estimation of performance.
- Use review - The current uses and need for the vehicle.
- Depreciation - Difference in price between purchase and estimated sales.
- Life costs - All costs, including depreciation, maintenance and fuel expenditures.

II. Replacement Planning - Planning shall be ongoing. Statistical data shall be reviewed by the Apparatus Program manager and made available to the Chief and Board of Commissioners. Data shall include fleet condition, age and mileage, user input, use review, depreciation, and life costs. Periodic fleet planning shall be updated using this data.

III. Replacement Criteria – these criteria shall be used to complete the vehicle review and included in the report.

1. Condition – analysis based on safety, dependability and condition of major components.
2. Age and mileage – an age and mileage standard shall be used as a trigger for replacement.
   - Command Vehicle and Staff 6 years or 60,000 miles, which ever occurs first.
   - Engine, Squad, Tender To be determined
3. User Input – driver and mechanic input shall be obtained and included with the annual report and or replacement recommendations.
4. Depreciation – current depreciation values based on leading professional periodicals (example - Kelley Blue Book) data shall be included and utilized in the reports and replacement recommendations.
5. Life Costs – all cost related to maintenance, depreciation and fuel shall be included in the reports and replacement recommendations.

IV. Budgeting – The District will strive to place 10% of its annual operating budget in the Equipment Replacement Line of the Reserve Fund. This fund will be designated for emergency vehicle replacement purposes only.

V. The Apparatus Program Manager shall be recommend vehicle replacement to the Chief after review completion. Upon Chief approval, the recommendation will then go to the Board of Commissioners for approval.

Appendix C

Command Vehicle Replacement Interview

Command Vehicle Replacement Cycle Interview

Department_____ Date_____
Name_____ Title_____

In terms of age and mileage, please indicate the figures that best describe your actual command vehicle replacement cycle (policy or not).

Mileage	Age
40k to 60k	3-5 years
60k to 80k	5-7 years
80k to 100k	7-9 years
100k and over	10 years

Command vehicle replacement cycle practices/policy. Please comment on how these issues factor in your decision making.

Age and mileage of the vehicle. Maintenance cost threshold (costing too much, not worth repair).
Gut feel. Replacement value (to sell before resale value declines dramatically).
New technology and/or features. New safety features/standards.
Politics – good or bad. Condition.
Other factors? New modernized fleet – to maintain a (modern) perception.
Extended use cycles – to maintain a (make do, conservative) perception.

Does your department utilize statistical data in command vehicle replacement decisions?

Yes
No

What are the components?

Does your practice or policy allow for input (mechanic and user), that could shorten or lengthen the command vehicle replacement cycle?

Yes
No

Please describe.

Is yours a written policy?

Yes
No

Please indicate the population served by your organization.

Up to 10,000
10,000 to 50,000
50,000 to 100,000
Over 100,000

Please indicate the size of your budget.

Up to 250,000
250,000 to 500,000
500,000 to 1,000,000
Over 1,000,000

Comments: